

# Expanding the Traditional Effectiveness Window



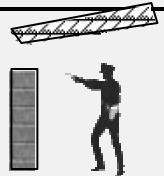
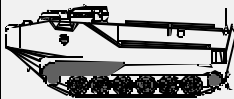

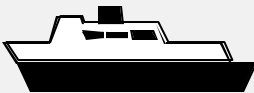




Jan Hasslid      Program Manager

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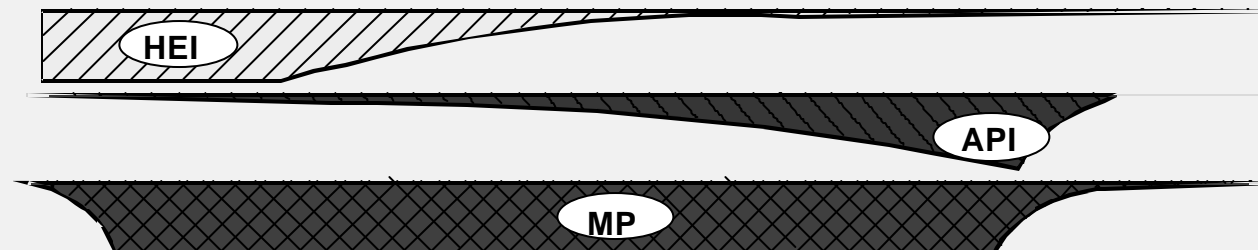
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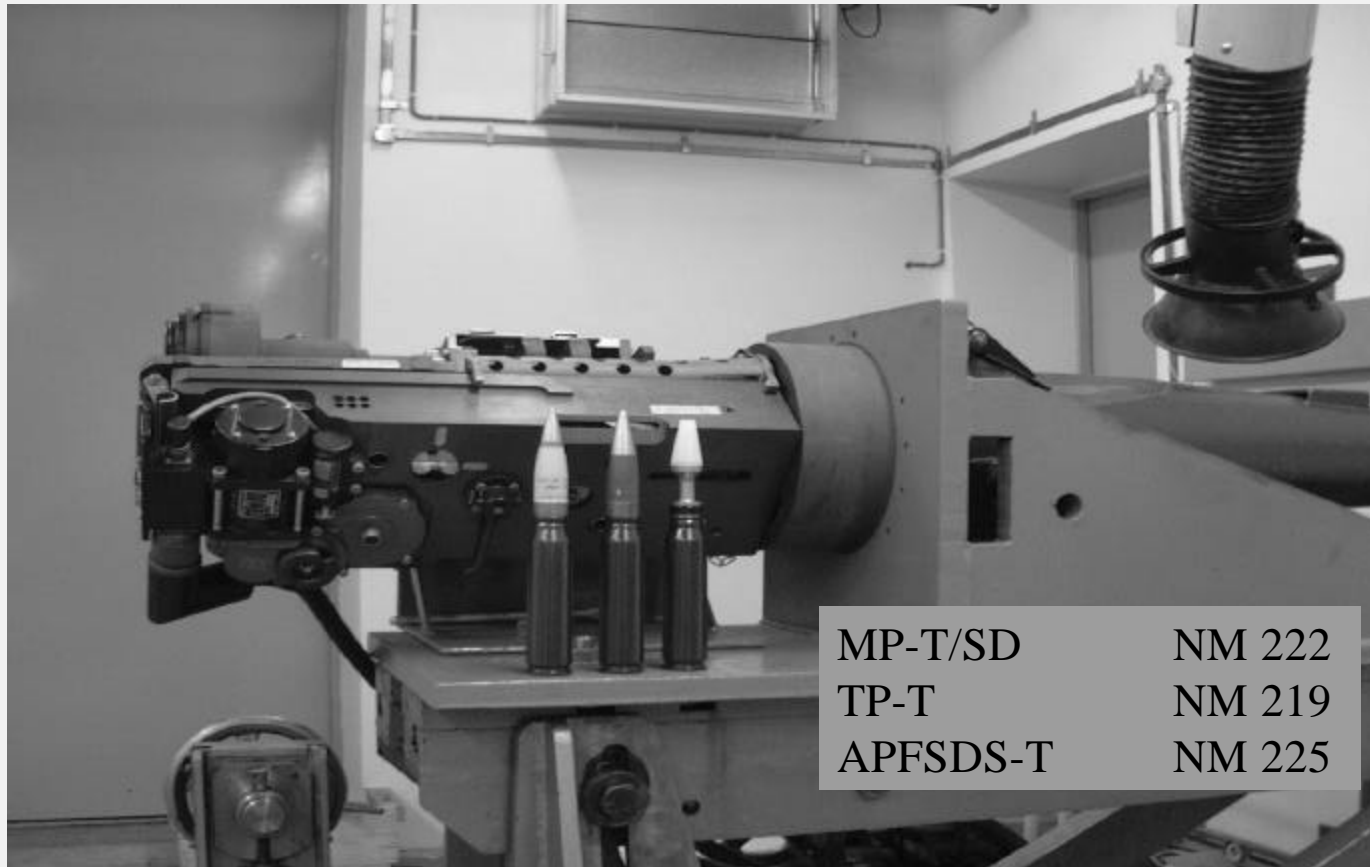
## TARGETS:

|  |   |   |   |   |
|--|---|---|---|---|
|   |  |  |  |  |
| UNPROTECTED PERSONNEL  | UNPROTECTED VEHICLES  | LIGHT FORTIFICATIONS  | LIGHT ARMORED VEHICLES  | HEAVY ARMORED VEHICLES  |
|  |   |  |   |   |
| LIGHT NAVY APPL.   |   | HEAVY NAVY APPLICATIONS   |   |   |
|   |   |  |  |   |
| HELICOPTERS  |   | FIGHTER AIRCRAFT  | FIGHTER BOMBER<br>TRANSPORT AIRCRAFT  |   |

## SHELL TYPES:



*30x173 Family of Ammunition qualified  
with the Bushmaster II mod 0 & mod 1*



|          |        |
|----------|--------|
| MP-T/SD  | NM 222 |
| TP-T     | NM 219 |
| APFSDS-T | NM 225 |

## AAAV TGT Matrix

- |                 | • <u>Light</u>    | <u>Medium</u>    | <u>Heavy</u> |
|-----------------|-------------------|------------------|--------------|
|                 | • <u>Infantry</u> | <u>BTR/Urban</u> | <u>BMP</u>   |
| • <b>HEI</b>    | *----- *          |                  |              |
| • <b>MPLD</b>   | *----- *          |                  |              |
| • <b>APFSDS</b> |                   | *----- *         |              |
| • <b>ABM</b>    | *----- -?????*    |                  |              |

- 
- **Expanding the Effectiveness Window**
  - **MRP-T** \*..... \*
  - **ABMP-T**\*----- \*

## *Pushmaster II- Traditional Long Rod Rock Penetration*



M E D I U M   C A L I B R E

Symposium Straume/Hasslid

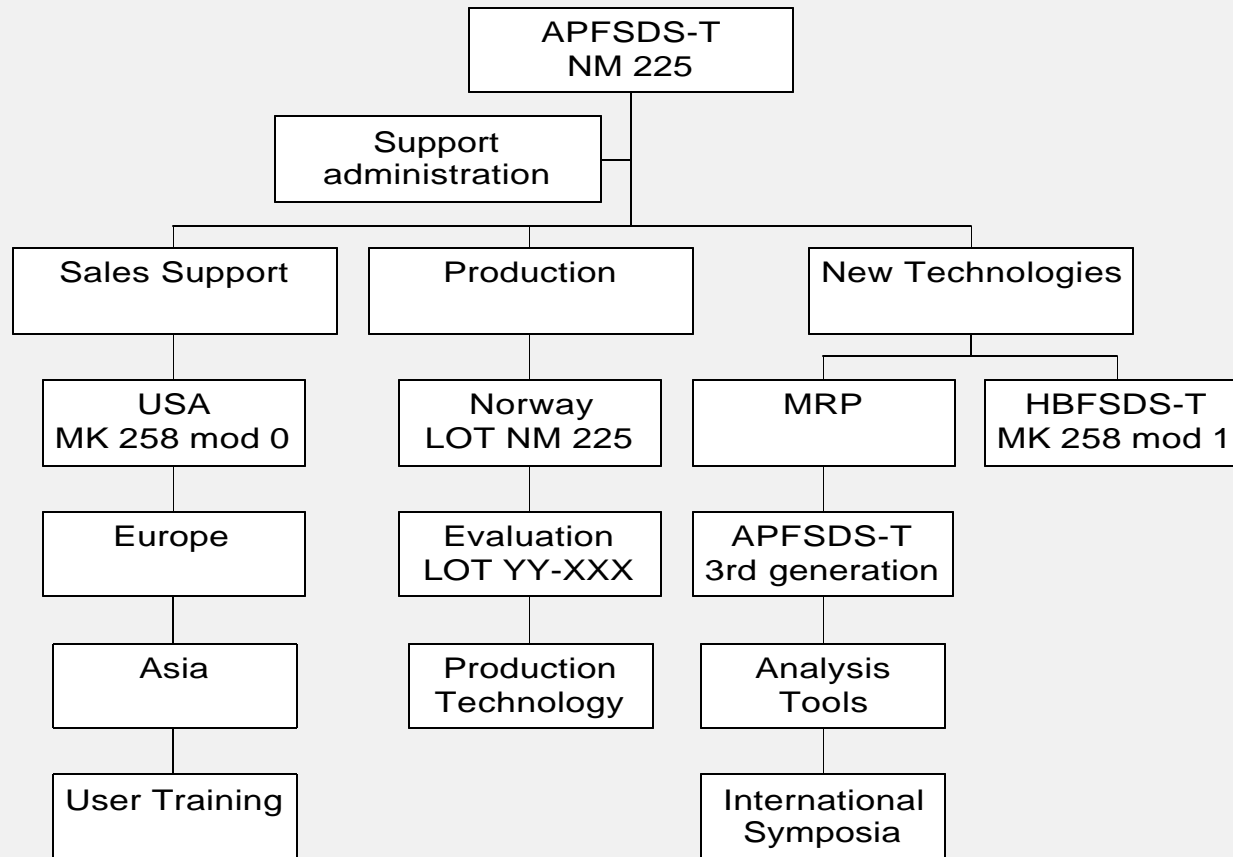
## *Bushmaster II-Optimized Long Rod Granite Rock Penetration with an APFSDS-T*

- SECONDARY EFFECTS
- Severe structural damage
- Lethal fragments scattered
- Dust cloud & Reduced Visibility





# 30x173 APFSDS-T Organization of activities 2001



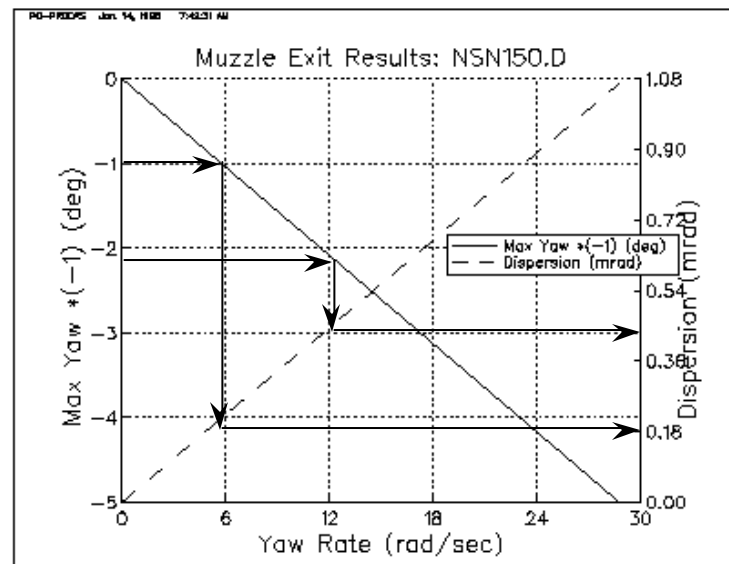
## *Supplier Selection Criteria for the User*

|  |   |  |  |
|--|---|--|--|
| <b><i>Modern Ammunition</i></b>  | <i>IM Performance</i>                             | <i>NATO standardized Ammunition family</i>                   | <i>Fits the engagement scenario for MOUT</i>           |
| <b><i>New Technologies Integration</i></b>                               | <i>EI Propellant</i>                              | <i>Hydrocode analysis for maximum performance</i>            | <i>CFD-analysis for superior exterior dynamics</i>     |
| <b><i>A Heritage and commitment for the future in medium caliber</i></b> | <i>The Multipurpose Concept</i>                   | <i>In service ammunition with Air Force, Navy &amp; Army</i> | <i>Integrated Process &amp; Production Development</i> |
| <b><i>Competitive in cost for performance</i></b>                        | <i>30mm stored kills outperform 35 &amp; 40mm</i> | <i>Low Lifecycle Cost</i>                                    | <i>All current target scenarios defeated</i>           |

# *Optimization*

***Approach!***

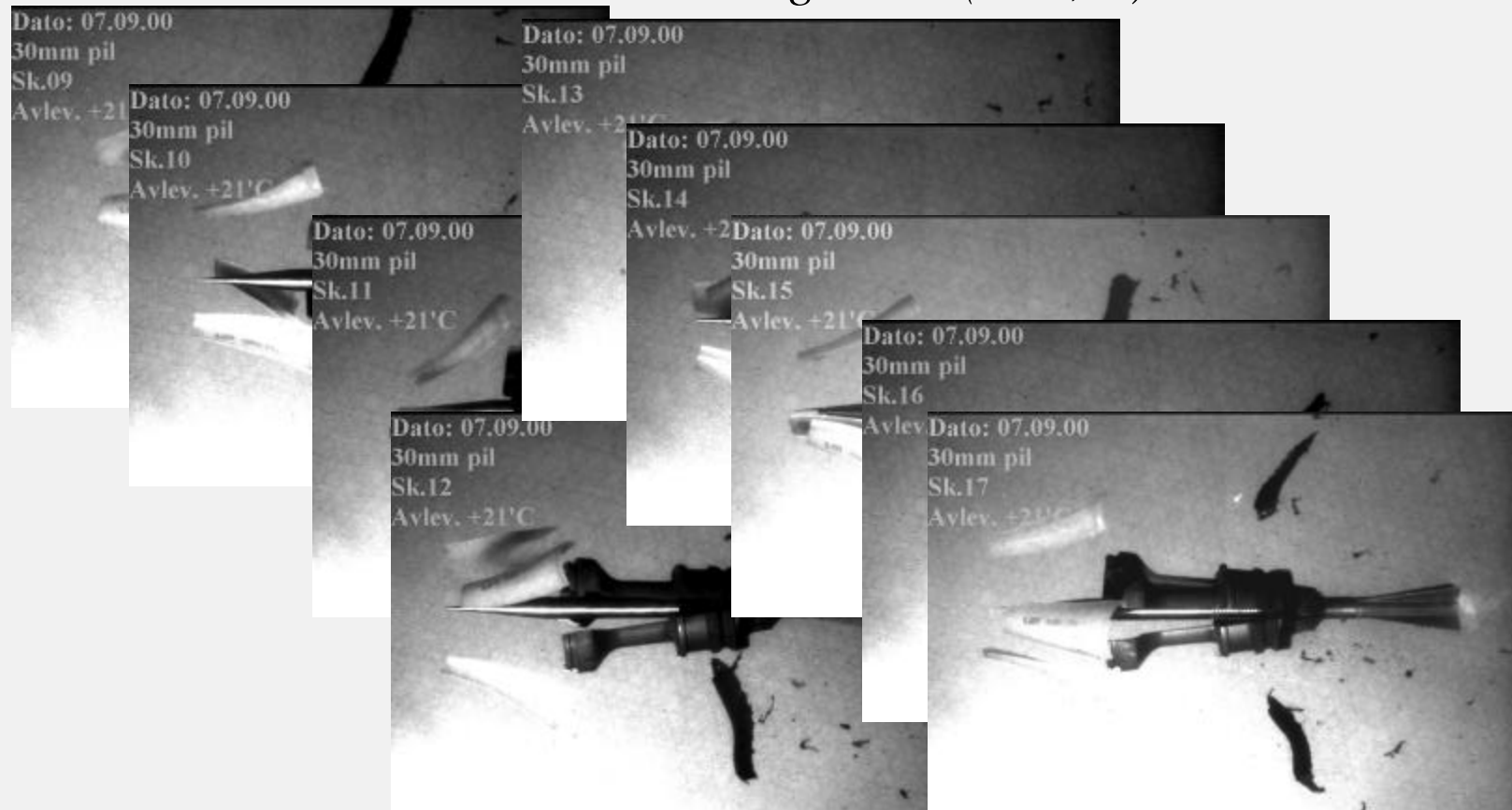
# Dispersion due to Initial Yaw-Condition



Muzzle Velocity = 1410.(m/sec) Mach Number =4.142

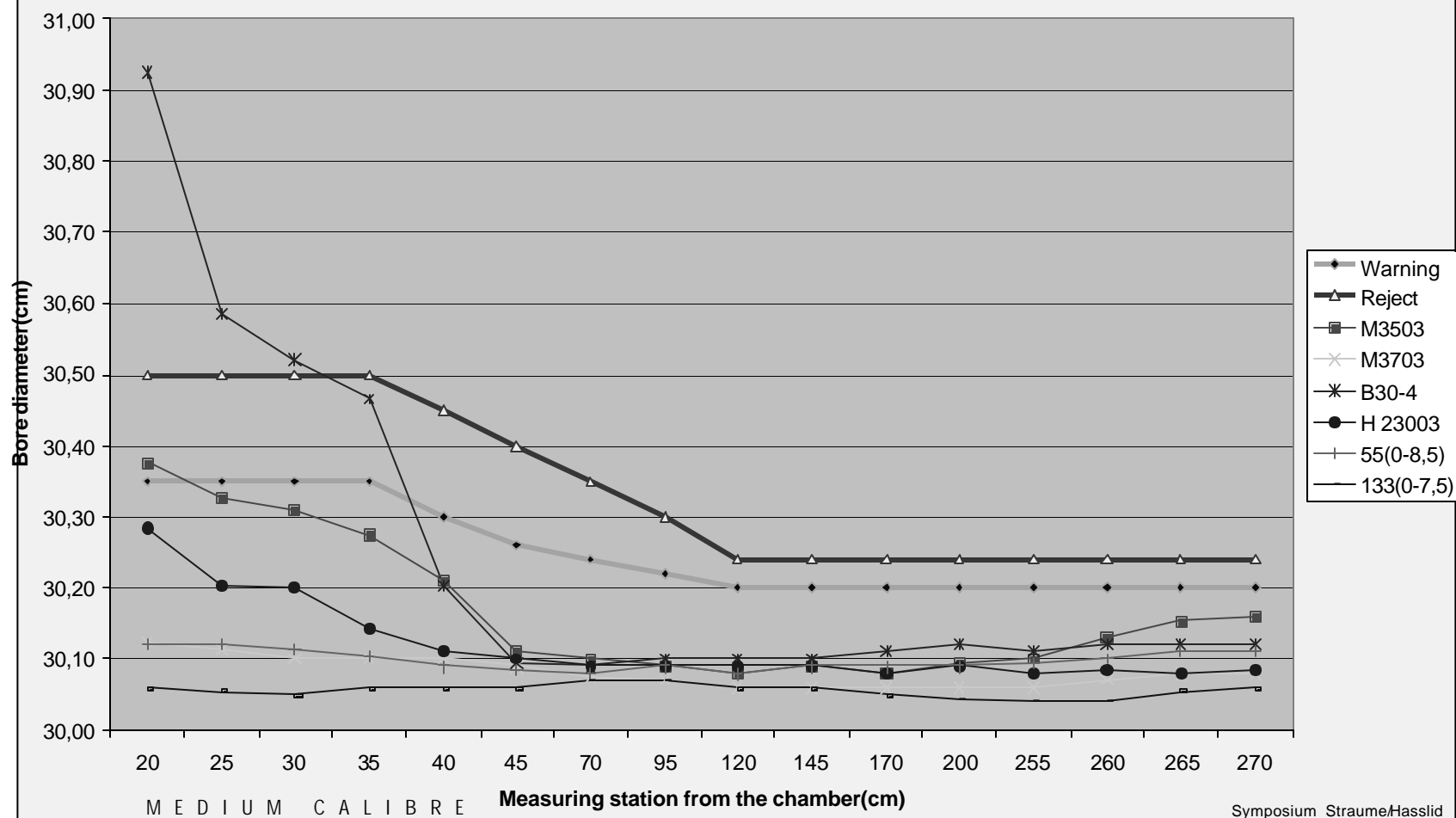
<CR> to Continue  
F1 for Plot Menu

## *Objective #1* *Bushmaster II integration (0'-8,5')*



# Barrel Interface Study

## 30x173 Barrel Interface Study



## ***DISPERSION RESULTS***

| Barrel             | Dispersion (1SD) |        |
|--------------------|------------------|--------|
|                    | Sx               | Sy     |
|                    | (mils)           | (mils) |
| Mauser Mann        | 0,15             | 0,15   |
| Bush II Mann       | 0,20             | 0,20   |
| Bush II Auto s.s.  | 0,35             | 0,35   |
| Bush II Auto burst | 0,45             | 0,45   |

# *Expanding the Traditional Effectiveness Window*

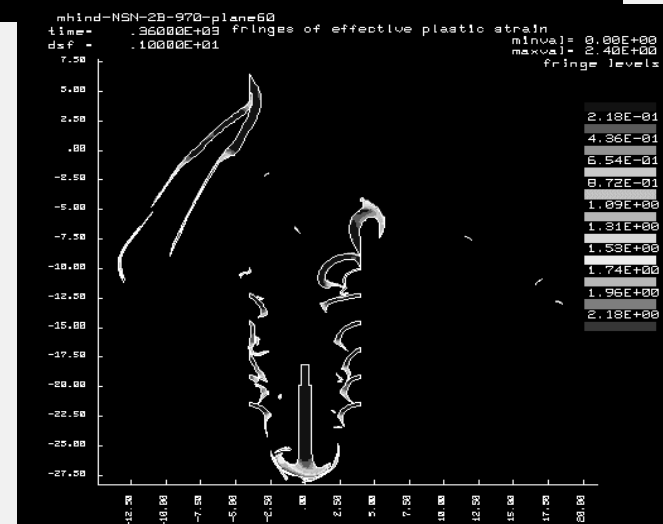
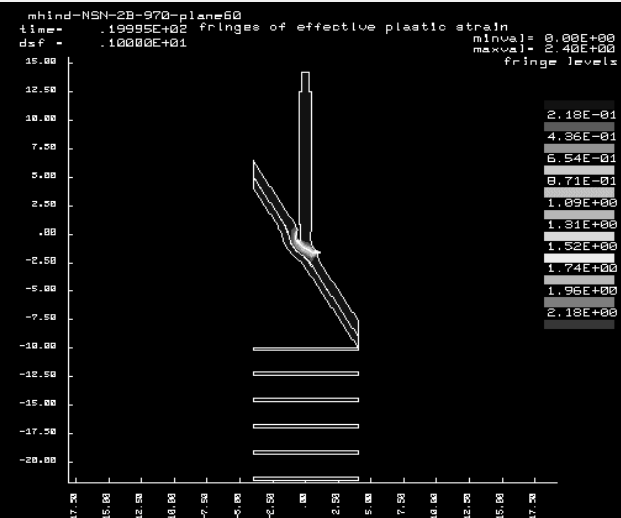
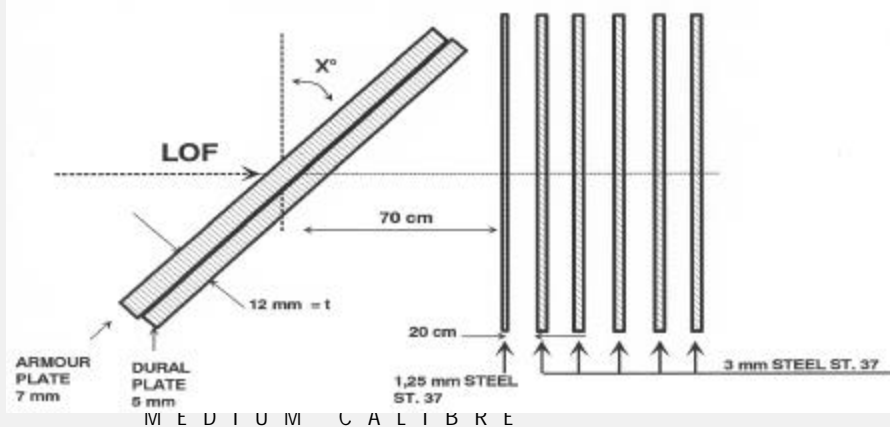
***APFSDS-T  $\Rightarrow$  MRP***

***Multi Role Penetrator***



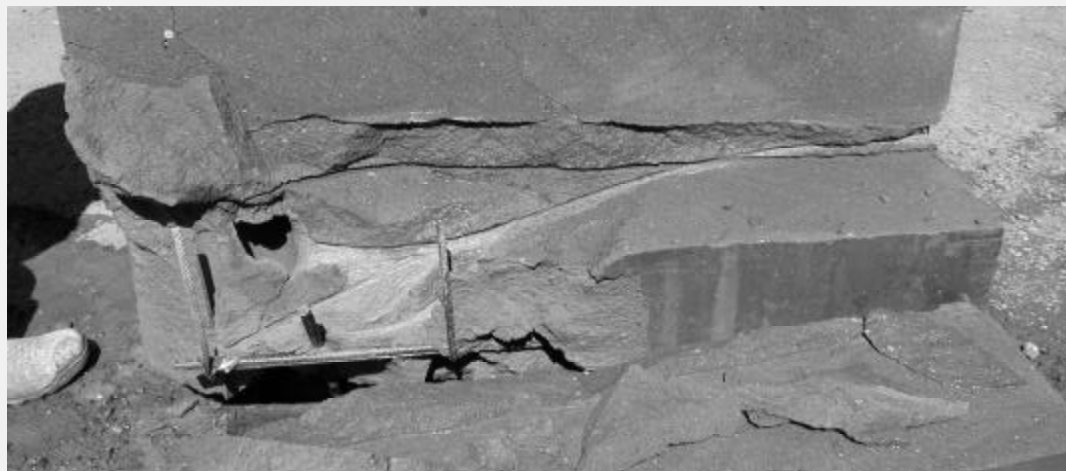


### TACTICAL TARGET



*Urban/Bunker Targets (600x600x1200)*

Projectile  
Break-Up



Target 1  
Entrance

Full  
Penetration  
(+15mm RHA)



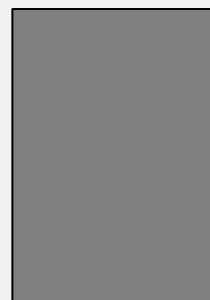
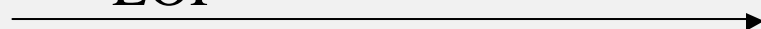
Target 2  
Entrance

## *30x173 APFSDS-T NM 225*

- *5 rds burst from the Bushmaster II mod 1 (chromed 0-7,5 deg)*
- *Reinforced Concrete block 1500x1500x300(5ftx5ftx1ft)*
- *Strength C55; Double matrix 12,7mm re-bar; Grain<8mm*
- *10,6mm ARMOX MIL-A-12560 with hardness HB 367*
- *3mm Steel witness plate of size 2000x2000 approx.*

LOF

$V_0=1430\text{m/s}$



305mm  
127m



10,6mm  
128,5m



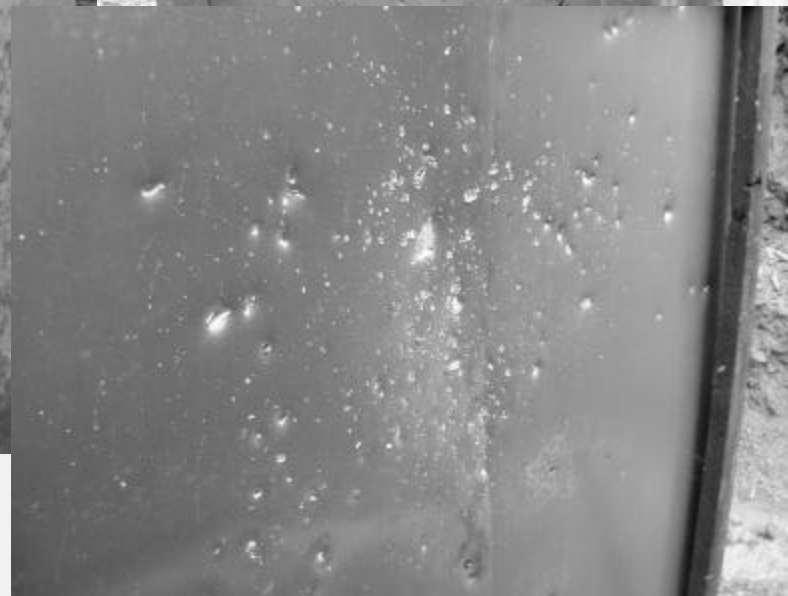
3mm  
129,5m

## *Urban Combo Target Set-Up*



M E D I U M   C A L I B R E

Symposium Straume/Hasslid



M E D I U M   C A L I B R E

# *Expanding the Traditional Effectiveness Window*

***MP-T/SD  $\Rightarrow$  ABMP-T***

***Air Burst Multi Purpose***

**3 Modus**

***Programmable time based fuze***

***Point Detonation***

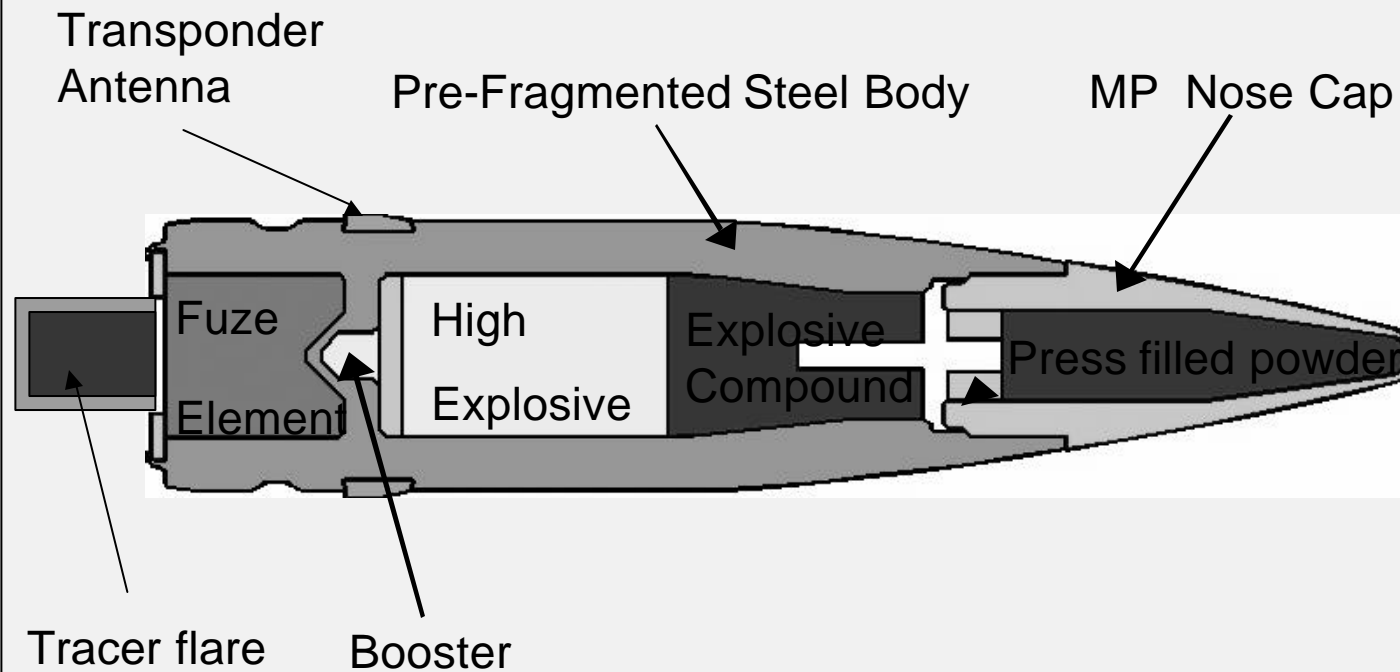
***Multi Purpose***

***-Detonation***

***-Detonation***

***-Deflagration***

## *ABMP-T Ammunition Concept*



## *SUMMARY*

- **Qualified ammunition defeats current targets as defined in performance spec.**
- **Effectiveness window expanded:**
  - **Urban Targets**
  - **Submerged Targets**
  - **Targets defeated at longer stand-off**
- **> Reduced System Cost and Product LCC**



*Mr. Short Rod & Mr. Long Rod at New Frontiers*



M E D I U M   C A L I B R E

The Parrot Rifle, Fredericksburg, VA

Symposium Straume/Hasslid